ABSTRACT

The present invention is a system and method for accurately calculating the spatial-temporal effects of a variety of environmental conditions on animal individual, population and community dynamics, given the animal's temperature-dependent behaviors, morphology and physiology, by running integrated microclimate and animal models to calculate the discretionary energy and water available to the animal and its activity time. The methodology requires relatively few, easily measured data to perform the calculations. The microclimate model translates a set of climate and other environmental conditions into a set of microclimate conditions experienced by an animal, given a set of the animal's characteristics. The animal model uses the microclimate conditions data and the set of animal characteristics data to solve for several animal conditions. Further calculations and several display options are available to a user, including spatial-temporal analyses. The method is implemented by use of a client-server system employing a graphical user interface, and a programming structure that allows for use of the methodology with personal computers, despite the large sizes of the databases that must be accessed. The method may also be implemented on individual computers.